Management of Osteoporosis and Fragility Fracture Risk Barnsley Guideline

(January 2022. To be reviewed in January 2025)

Osteoporosis is a disease characterised by low bone mass and structural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture.

Fragility fractures are fractures that result from mechanical forces that would not ordinarily result in fracture, known as low-level (or 'low energy') trauma. The World Health Organization (WHO) has quantified this as forces equivalent to a fall from a standing height or less. Reduced bone density is a major risk factor for fragility fracture. Other factors that may affect the risk of fragility fracture include the use of oral or systemic glucocorticoids, age, sex, previous fractures, family history of osteoporosis, smoking and excessive alcohol consumption.

Fragility fractures occur most commonly in the spine (vertebrae), hip (proximal femur) and wrist (distal radius). They may also occur in the arm (humerus), pelvis, ribs and other bones.

Targeting fracture risk assessment

Consider assessment of fracture risk:

- In all women aged 65 years and over and all men aged 75 years and over
- in women aged under 65 years and men aged under 75 years in the presence of risk factors, for example:
    - previous fragility fracture
    - current use or frequent recent use of oral or systemic glucocorticoids for more than 3 months at a dose of prednisolone of 5mg daily or more (or equivalent doses of other glucocorticoids)
    - history of falls
    - family history of hip fracture
    - other causes of secondary osteoporosis
    - low body mass index (BMI) (less than 18.5 kg/m2)
    - current smoking
    - alcohol intake of more than 14 units per week for both men and women.

Causes of secondary osteoporosis include

- endocrine (hypogonadism in either sex including untreated premature menopause and treatment with aromatase inhibitors or androgen deprivation therapy; hyperthyroidism; hyperparathyroidism; hyperprolactinaemia; Cushing's disease; diabetes)
- gastrointestinal (coeliac disease; inflammatory bowel disease; chronic liver disease; chronic pancreatitis; other causes of malabsorption)
- rheumatological (rheumatoid arthritis; other inflammatory arthropathies)
- haematological (multiple myeloma; haemoglobinopathies; systemic mastocytosis)
- respiratory (cystic fibrosis; chronic obstructive pulmonary disease)
- metabolic (homocystinuria)
- chronic renal disease
- immobility (due for example to neurological injury or disease)
- Drugs as anti-convulsants, selective serotonin reuptake inhibitors, thiazolidinediones, proton pump inhibitors and antiretroviral drugs

Do not routinely assess fracture risk in people aged under 50 years unless they have major risk factors (for example, current or frequent recent use of oral or systemic glucocorticoids, untreated premature menopause or previous fragility fracture), because they are unlikely to be at high risk.

Methods of fracture risk assessment

Estimate 10-year of absolute risk of developing fragility fracture using FRAX[1] (without a bone mineral density [BMD] value if a dual energy X-ray absorptiometry [DXA] scan has not previously been undertaken).

[1]FRAX: http://shef.ac.uk/FRAX

Request DXA scan to measure BMD only if 10-year risk is more than 10% and recalculate absolute risk using FRAX with the BMD value.

Consider recalculating fracture risk in the future if the original calculated risk was in the region of the intervention threshold for a proposed treatment (>20%) and only after a minimum of 2 years, **or** when there has been a change in the person's risk factors.

Limitations of FRAX

FRAX may underestimate fracture risk in certain circumstances, for example if a person: has a history of multiple fractures, has had previous vertebral fracture(s), has a high alcohol intake, is taking high-dose oral or high-dose systemic glucocorticoids or has other causes of secondary osteoporosis. Fracture risk can also be affected by factors that may not be included in the risk tool, for example living in a care home or taking drugs that may impair bone metabolism.

Investigation of osteoporosis

Following tests should be performed to look for a secondary cause or to exclude mimics as osteomalacia and myeloma and to assess the risk of subsequent fractures.

All patients

- History and physical examination
- FBC, ESR (if raised measure serum paraproteins and urine Bence Jones protein to exclude multiple myeloma)
- Bone and liver function tests (Calcium, Phosphate, Alkaline phosphatase, albumin, ALT/GGT)
- Serum creatinine, eGFR
- Vitamin D

Additional tests if indicated from the history

- TFT, PTH
- Serum testosterone, LH, FSH and SHBG, PSA (men)
- 24 hour urinary calcium excretion
- Endomysial and/or tissue transglutaminase antibodies (coeliac disease)
- 24 hour urinary cortisol/dexamethasone suppression test
- Lateral radiographs of lumbar and thoracic spine/DXA-based vertebral imaging

Bone marker

- P1NP

Treatment of Osteoporosis and prevention of fragility fracture

General management: includes -

1. Assessment of the risk of falls and their prevention
2. Appropriate lifestyle advice should be offered –
   - Not to smoke (consider referral to smoking cessation clinic)
   - To avoid excessive alcohol consumption (≤14 units a week)
   - To undertake regular weight bearing exercise (the equivalent of 30mins walk 3 times per week)
   - To ensure adequate calcium and vitamin D intake [RNID for calcium 700mg/day with 400IU vitamin D for over 65s]
   - Vitamin D and calcium supplements that are required for the TREATMENT of osteoporosis should be prescribed by the practitioner as per the exemption category in the Barnsley Self-Care Guidance.
   - Patients 'at risk' of osteoporosis should be advised to purchase vitamin D and calcium supplements where appropriate in line with the self-care guidance, unless there is a medically diagnosed deficiency. If in exceptional circumstances with clinical assessment a prescriber has concerns that a patient might be unable/unwilling to self-care then a prescription (FP10) may be considered.
   - To maintain good nutrition and normal body weight

Lifestyle and dietary measures

- A daily calcium intake of between 700 and 1200mg should be advised, if possible achieved through dietary intake, with use of supplements if necessary.
- In postmenopausal women and older men (>50 years) at increased risk of fracture a daily dose of 800IU cholecalciferol should be advised.
- In postmenopausal women and older men receiving bone protective therapy for osteoporosis, calcium supplementation should be given if the dietary intake is below 700 mg/day, and vitamin D supplementation considered in those at risk of or with evidence of vitamin D insufficiency.
- Regular weight-bearing exercise should be advised, tailored according to the needs and abilities of the individual patient.
- Falls history should be obtained in individuals at increased risk of fracture and further assessment and appropriate measures undertaken in those at risk.

https://www.sheffield.ac.uk/NOGG/mainrecommendations.html

Major pharmacological interventions (see care pathway)

(Check eGFR, Calcium and Vitamin D level before initiating treatment)

As recommended by NICE, Therapeutic intervention threshold agreed with consensus by clinicians with interest in treating osteoporosis in Barnsley is >20% for major osteoporotic fracture.

Drug name	Dose	Specific indication	Cost of yearly treatment (Drug Tariff November 2021 or eMIMs 2021)	Any other comment
First line agent				
Alendronic acid (**generic**)	70 mg PO once a week	Treatment of postmenopausal osteoporosis, Treatment of osteoporosis in men, Prevention and treatment of corticosteroid-induced osteoporosis in postmenopausal women not receiving HRT.	£11	**Drug of choice as recommended by NICE. Overnight fast required. To be taken 30 minutes before food/drink/medication. Take with a full glass of water and remain upright for 30 minutes.**
Second line agent				
Risedronic acid	35 mg PO once a week	As above **AND** if Contraindication or intolerance of Alendronic acid	£25	Side effect profile is similar to Alendronic acid.
Alendronic acid Effervescent (Binosto®)	70 mg PO once a week	Post menopausal osteoporosis (PMO), Osteoporosis in Men, steroid induced osteoporosis	£140	Reserve for patients who are unable to swallow tablets or who have intolerable side effects with normal tablets, despite following recommendations for administration, and have previously tried alendronic acid **and** risedronic acid.
Third line agent				
Zoledronic acid	5 mg IV once a year	As above **AND** if Contraindication / intolerance/ non-compliance with oral treatment	£254 + administration cost	'Red' drug. Infusion service is provided from PIU at BHNFT if referred into the service.

Denosumab	60 mg s.c. once in 6 months	PMO **AND** if Contraindication / intolerance/ non-compliance with oral treatment or not suitable for Zoledronic acid	£366	'Amber' drug Given as subcutaneous injection (Shared care guideline available)
Raloxifene	60 mg daily	Can be tried in PMO women who are not appropriate for other treatment options	£62	Can cause venous thromboembolism, stroke and breast cancer.
Fourth line agent (Specialist use only)				
Teriparatide	20 mcg s.c. daily for 18-24 months	If above treatment options fail **AND** fulfils NICE criteria	£4894 for 18 months; £6526for 24 months.	Compliance with the treatment is the major factor resulting in poor response. Try other options before prescribing Teriparatide due to **high treatment cost.**

- Ensure calcium level is normal and Vitamin D level is above 25 nmol /l (preferably above 50) before prescribing any form of treatment.
- A suitable calcium and vitamin D supplementation be routinely co prescribed with a treatment drug unless clinically not recommended (Accrete D3 1 tab BD).
- Adequate oral hygiene should be maintained during and after treatment with Bisphosphonates due to risk of developing osteonecrosis of jaw (ONJ). Remedial dental work should be carried out before starting Bisphosphonate treatment.
- Symptom of thigh pain should be regularly monitored to avoid atypical femoral fracture.

For the purposes of this guidance, an **unsatisfactory response** is defined as occurring when another fragility fracture occurs despite adhering fully to treatment for 1 year or there is evidence of a significant decline in BMD (>4%) below pre-treatment baseline.

For the purposes of this guidance, **intolerance of Bisphosphonate** is defined as persistent upper gastrointestinal disturbance that is sufficiently severe to warrant discontinuation of treatment, and that occurs even though the instructions for administration have been followed correctly.

Bisphosphonates are licensed for use with eGFR>30 ml/min. Denosumab can be prescribed with eGFR>15 ml/min.

Other contraindications include patients who have the inability to sit upright for more than 30-60 minutes

Review at 3 months: Treatment adherence and tolerability of treatment drug should be assessed.

Duration and monitoring of bisphosphonate therapy *(Follow Barnsley Osteoporosis Drug Holiday Guideline)*

Links have emerged with the rare but serious complications of osteonecrosis of the jaw (1 case per 100 000 person-years for osteoporosis bisphosphonate treatment) and atypical subtrochanteric fracture (2-78 cases per 100 000 person-years) after long-term bisphosphonate therapy. Hence, the need for continuation of treatment should be reviewed after 5 years for alendronate, risedronate and after 3 years for zoledronic acid.

Specialist advice

Specialist advice should be sought in following circumstances –

- Intolerance of oral treatment
- Premenopausal osteoporosis and osteoporosis in men
- Osteoporosis with eGFR <30 ml/min
- Hypercalcaemia
- Unsatisfactory response to treatment

SPECIAL SITUATIONS

Treatment of pre-menopausal osteoporosis: Osteoporosis with increased risk of future fracture is uncommon. Thorough investigation is necessary to exclude any secondary cause. Also, osteoporosis drugs are NOT licensed for use in this group. Hence, these patients should be referred to a specialist clinic.

Treatment of osteoporosis in men: Secondary causes of osteoporosis are not commonly found amongst men, so this population requires thorough investigation. Consideration should be given to referring men with osteoporosis to specialist clinic, particularly younger men (below age 65 years) or those with severe disease.

Treatment for Depo-Provera induced low BMD

- T score -1 to -2.5: Optimise lifestyle, Adequate calcium/vitamin D intake and regular weight bearing exercises
- T score < -2.5: osteoporosis: Exclude secondary causes and discuss relevant risk factors. Advise to discuss alternative contraceptive option. Repeat DXA after 5 years.

Treatment for steroid contributed low BMD

(≥3 months continuous OR Intermittent ≥3 courses/year)

- Age ≥ 65: Start 'bone protective treatment' on starting steroid and arrange DXA within 3 months. Continue to treat if T score < -1.5
- Age < 65: Start 'bone protective treatment' ONLY if T score < - 1.5.

Repeat DXA in 2-3 years in both age groups.

Drug options: Alendronate 70 mg/wk, Risedronate 35 mg/wk, Zoledronate 5mg/yr, Teriparatide.

References:

- NOGG Executive summary. Osteoporosis: Clinical guideline for prevention and treatment (November 2014)
- CG 146 (NICE): Osteoporosis – assessing the risk of fragility fracture (August 2012)
- WHO FRAX Tool: http://www.shef.ac.uk/FRAX

Development process

This guideline was originally produced by Dr Jha, (Consultant Geriatrician & Trust Lead Falls and Bone Health service Fellow, SWYPFT) in consultation with Dr. Merza, Dr. Lee and Dr. Croot at BHNFT and approved at the APC in July 2016.

This Guideline was updated in December 2021, approved at the Area Prescribing Committee on 12th January 2022 and is due for review in January 2025.

MANAGEMENT OF OSTEOPOROSIS AND FRAGILITY FRACTURE RISK: BARNSLEY CAREPATHWAY

Adult with possible risk of fragility fracture *

Adult with recent fragility fracture

Complete Falls assessment

Step 1
Assess Risk

- Calculate 10-year probability of major osteoporotic fracture using FRAX or QFracture * without BMD
- Consider risk of falling

Step 2
Risk Stratification

Low risk
10-year risk <10%

Moderate risk
10-year risk 10 – 20%

Moderate risk
10-year risk 10 – 20%

High risk
10-year risk >20%

Arrange DXA scan for BMD assessment and recalculate 10-year fracture risk

DXA scan for BMD assessment is optional but can be arranged for the monitoring of therapy

Non-vertebral Fracture

Vertebral Fracture

Step 3
Therapy decision

T score at spine or hip ≤ - 2.5
Or 10-year risk >20%

T score at spine or hip ≤ - 2
Or 10-year risk >20%

- No pharmacological therapy
- Lifestyle advice only

- Treatment with pharmacological therapy *(Refer to Management of Osteoporosis and Fragility Fracture Risk Barnsley Guideline 2022)*
- Exclude secondary causes of osteoporosis and increased fracture risk
- Lifestyle advice

Step 4
Monitoring

- Ensure adherence with treatment at 3 months if starting treatment
- Reinforce lifestyle advice
- Arrange a follow up DXA scan in 3-5 years and consider 'drug holiday' (refer to Barnsley Drug Holiday Guideline 2022)
- If unsatisfactory response, intolerance or contraindication of Bisphosphonates, then, consider specialist referral

Major risk factors for osteoporosis and fragility fracture: Prior fragility fractures, Parental history of hip fractures, Current glucocorticoid treatment for ≥ 3 months at a dose of prednisolone of 5mg daily or more (or equivalent doses of other glucocorticoids), Current smoker, Alcohol intake of ≥ 3 units per day